

Congressional Notification Profile

DE-PS26-02NT41369

UNIVERSITY COAL RESEARCH PROGRAM, CORE PROGRAM
University of Florida

Background and Technical Information:

This project proposes to develop, build and test a lab-scale diffusion-driven desalination plant and evaluate its performances over a range of operating conditions. The DDD technology would replace cooling towers in fossil-fueled power plants, enabling the plants to become fresh water producers rather than large consumers. Energy that drives the DDD process would come from the main condenser that cools water, which would otherwise be discharged. Simulation and modeling tools would be added to help optimize the design of components and identify optimal operating conditions.

Contact Information:

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Congressional District: 05 District County: Alachua

Financial Information:

Length of Contract (months): 36
Government Share: \$198,539
Total value of contract: \$198,539

DOE Funding Breakdown:

Funds: FY 2002 \$198,539

Abstract

The continuous rise in the world population and the expansion of industrial facilities around the globe has placed a growing demand on the fresh water supply from natural resources (rivers, fresh water lakes, underground aquifers, and brackish wells). These resources have been steadily on the decline since the early 1950's. Therefore the need for new fresh water resources to balance the growing consumption rate has been a serious concern facing governments and world organizations for the past 50 years.

In the United States there exists significant interest in developing clean-coal technologies for electricity generation to meet the growing electricity demand. Power generated from fossil fuels, especially coal, places a large demand on fresh water resources. Approximately 30 gallons of fresh water are required for every kWh of power produced from coal. This places fossil fired power plants in direct competition with processing industries and municipalities for fresh water resources that are on the decline. In some regions of the nation (Southeast and Southwest) fresh water is in such low supply, the environmental and regulatory concerns could be such to inhibit further development of clean-coal power generation technologies.

This proposal presents a truly innovative plan for the development of a diffusion-driven desalination (DDD) plant to produce fresh water and replace cooling towers in existing or future fossil fired power plants. The tremendous advantage gained with this new technology is that the diffusion driven desalination process requires a very low temperature energy input. The energy picked up by the main condenser cooling water from low-pressure steam is very well suited for the DDD process. Therefore, the energy used to drive the desalination process is energy that would have otherwise been dissipated in the environment. In addition, a diffusion driven desalination plant operating in conjunction with a fossil driven power plant would allow the power plant to become a net producer of fresh water rather than being a consumer. It is anticipated that the capital investment required to build a DDD plant could be readily recovered by selling fresh water to local industry and municipalities. The potential economic and environmental benefits for the proposed technology are so substantial they greatly favor exploring its development.